

## Notice of Allowability

Application No.

10/665,462

Applicant(s)

CHEN ET AL.

Examiner

Juan A. Torres

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Amendment - After Non-Final Rejection filed on 05/16/2007.
2. ☒ The allowed claim(s) is/are 1-4 and 6-10 (renumbered 1-9).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
  1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

### Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),  
Paper No./Mail Date \_\_\_\_\_
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),  
Paper No./Mail Date \_\_\_\_\_
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_

## **DETAILED ACTION**

### ***Drawings***

The modifications to the drawings were received on 05/16/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 05/16/2007, the Examiner withdraws drawing objections of the previous Office action.

### ***Specification***

The modifications to the specification were received on 05/16/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 05/16/2007, the Examiner withdraws specification objections of the previous Office action.

### ***Claim Objections***

The modifications to the claims were received on 05/16/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 05/16/2007, the Examiner withdraws claim objections to claims 1, 2, 3, 5, and 7-10 of the previous Office action.

### ***Claim Rejections - 35 USC § 101***

The modifications to the claims were received on 05/16/2007. These modifications are accepted by the Examiner.

In view of the amendment filed on 05/16/2007, the Examiner withdraws claim rejections under 35 USC § 101 to claims 1-6 of the previous Office action.

***Allowable Subject Matter***

Claims 1-4 and 6-10 (renumbered 1-9) are allowed.

The following is an examiner's statement of reasons for allowance: claims 1-4 and 6-10 (renumbered 1-9) are allowed because the references cited fail to teach, as applicant has, a method for updating coefficients in a decision feedback equalizer having an ISI canceller for canceling inter-symbol interference (ISI) from a plurality of first signals received from a channel, the method comprising receiving the plurality of first signals having ISI, decoding a first symbol comprising a set of the first signals having ISI to generate a decoded symbol having ISI, wherein the first symbol has  $(k+1)$  chips, and  $k$  is a natural number, obtaining a vector of error values computed as the difference between the decoded symbol, and the first symbol, generating a temp matrix according to the decoded symbol and the vector of the error values, averaging the values of the elements in every diagonal line of the temp matrix to generate a Toeplitz Matrix, updating the coefficients by the Toeplitz Matrix; and canceling the ISI from the decoded symbol with the ISI canceller, using the updated coefficients; and a decision feedback equalizer, comprising: an ICI canceller for canceling ICI from a signal received from a channel and outputting a first signal without ICI; and an ISI canceller, comprising: a symbol decoder for decoding a first symbol comprising a set of the first signals to generate a decoded symbol; and a symbol-base feedback filter with a plurality coefficients for transforming the decoded symbol by a Toeplitz Matrix  $H(m)$  to cancel ISI from the present decoded symbol, and generating an output signal; wherein the first symbol has  $(k+1)$  chips, the Toeplitz Matrix is a  $(k+1) \times (k+1)$  matrix,  $m$  is the symbol time

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of the first symbol, the chip times of the first symbol are from  $(n-k)$  to  $n$ ,  $n$ ,  $k$  and  $m$  are natural numbers and  $n=(k+1)m$ ;

$$H(m) = \begin{bmatrix} \left( \sum_{i=0}^k E^*(n-i)C(n-i) \right) / (k+1) & \left( \sum_{i=0}^{k-1} E^*(n-(i+1))C(n-i) \right) / k & \dots & \dots & E^*(n-k)C(n) \\ \left( \sum_{i=0}^{k-1} E^*(n-i)C(n-(i+1)) \right) / k & \left( \sum_{i=0}^k E^*(n-i)C(n-i) \right) / (k+1) & & & \left( \sum_{i=0}^{k-(k-1)} E^*(n-(i+k-1))C(n-i) \right) / 2 \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ \dots & \dots & \dots & \dots & \dots \\ \left( \sum_{i=0}^{k-(k-1)} E^*(n-i)C(n-(i+k-1)) \right) / 2 & \left( \sum_{i=0}^{k-(k-2)} E^*(n-i)C(n-(i+k-2)) \right) / 3 & \dots & \dots & \left( \sum_{i=0}^{k-1} E^*(n-(i+1))C(n-i) \right) / k \\ E^*(n-k)C(n) & \left( \sum_{i=0}^{k-(k-1)} E^*(n-i)C(n-(i+k-1)) \right) / 2 & \dots & \dots & \left( \sum_{i=0}^k E^*(n-i)C(n-i) \right) / (k+1) \end{bmatrix}$$

where  $E(n)$  is a vector of error values computed as the difference between the chip of the decoded symbol at the chip time  $n$ , and the chip input to the symbol decoder at the chip time  $n$ , and  $C(n)$  is the chip of the decoded symbol at the chip time  $n$ , as the applicant has claimed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is 571-272-3119. The examiner can normally be reached on 8-6 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone

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number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Juan Alberto Torres  
05-24-2007

TEMESGHEN GHEBRANSAE  
PRIMARY EXAMINER  
6/1/07